

REMARKS

Claims 1-3 and 5 are pending and are rejected in the application.

Drawings

The drawings are objected to because Fig. 4 should be designated by a legend such as --Prior Art -- because only that which is old is illustrated.

Fig. 4 is amended to recite "Prior Art" as suggested by the Examiner. Applicants submit that the objection is overcome and request that the objection be withdrawn.

The drawings are objected to under 37 CFR §1.83(a). The drawings must show every feature of the invention specified in the claims.

Further to the amendment of claim 1, "...a LC resonant circuit comprised of a resonating reactor connected in series with said ~~primary~~ secondary side winding of said transformer", Applicants request that the objection is overcome and request that the objection be withdrawn.

Claim Rejections - 35 U.S.C. §102

Claims 1 and 2 are rejected under 35 U.S.C. §102(b) as being anticipated by Scheel (US 6,351,401).

Claim 1 is amended to recite, "a LC resonant circuit comprised of a resonating reactor connected in series with said ~~primary~~ secondary side winding of said transformer, and a resonating capacitor that resonates with said resonating reactor....."

The specification of the present application at paragraph [0029] (page 12) states, "... the side of the low-voltage side terminals 8-1 and 8-2 may be referred to as the primary side and the side of the high-voltage side terminals 9-1 and 9-2 may be referred to as the secondary side in some cases."

Accordingly, further to the aforementioned portion of the specification and FIG. 2 of the present application, the LC resonant circuit 3 is comprised of a resonating reactor connected in series with a secondary side winding of the transformer. The aforementioned amendment to claim 1 reflects said connection relationship.

Further, the Office Action at page 2 in the Response to Arguments section asserts, "Applicant further argues that Scheel fails to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the LC resonant circuit is located on the secondary side of the transformer) are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims."

It is clear that Scheel describes the LC resonant circuit on the primary side of the transformer (see FIG. 1, L, C) rather than on the secondary side. In view of the Examiner's assertion and the foregoing amendment to claim 1, Applicant's respectfully submit that the cited art fails to teach or suggest either explicitly or implicitly at least the recitation of claim 1 of "a LC resonant circuit comprised of a resonating reactor connected in series with said ~~primary~~ secondary side winding of said transformer, and a resonating capacitor that resonates with said resonating reactor...."

Although the above comments are directed to claim 1, said comments are applicable toward dependent claim 2 where appropriate to overcome the cited art.

Applicants respectfully submit that the rejection is overcome.

Claims 3 and 5 are rejected under 35 U.S.C. §102(e) as being anticipated by Jang (US 5,057,698).

It is to be noted that it appears the Office Action provided an incorrect patent number for the Jang et al. reference. The Widener et al. reference has a patent number of 5,057,698, whereas Jang et al. has a patent number of 6,934,167. The following analysis assumes the rejection relates to Jang et al. (US 5,057,698).

Applicant's submit that the reference fails to describe either explicitly or implicitly all of the recitations of claim 3 of the present application. More specifically, Applicant's submit that the cited art fails to describe at least the recitation of claim 3 of "said driving means drives said low-voltage side pair of switching means or said high-voltage side pair of switching means by correcting their on-state lapses of time so that their on-state resonant currents may be nearly equal to each other based on the detected output of said resonant current detecting means."

The Office Action at page 6 contends that the resonant current detecting means of claim 3 is described by the primary and secondary current sense of FIG. 4 of Jang. The Office Action further contends that the driving means of claim 3 is described by the primary-current feedback frequency control of Jang.

Jang relates to a contactless electrical energy transmission system having a primary side current feedback control and soft-switched secondary side rectifier. Further, Jang describes a

primary control circuit detecting current changes through the primary resonant circuit to control the switching frequency of a controllable switching device for maintaining a substantially constant energy transfer between the primary winding and secondary winding in response to at least one of a power source voltage change and a load change. (Jang; See Abstract).

More specifically, the primary-current feedback frequency control block of FIG. 4 of Jang controls a primary switching frequency for regulating the power transfer between the primary and secondary sides. The current through the primary winding is controlled in response to a sensed current change that is caused by a power voltage V_s or a load change. More specifically, a primary controllable switching device has a switching frequency that controls the current flow through the primary winding. This aspect of Jang senses primary resonant current changes for controlling the switching frequency of the primary controllable switching device so that the transferred power through the transformer is automatically maintained constant relative to power voltage V_s and load changes. (Jang; column 3, lines 27-61).

In view of the foregoing, it is apparent that Jang does not describe the recitation of the driving means of claim 3 (primary-current feedback frequency control of FIG. 4 of Jang) as driving the low-voltage side pair of switching means or the high-voltage side pair of switching means by correcting their on-state lapses of time so that their on-state resonant currents may be nearly equal to each other based on the detected output of the resonant current detecting means as recited in claim 3 of the present application.

Furthermore, the Office Action generally asserts that FIG. 7F of Jang shows the driving means adjusting the current to be nearly equal. However, FIG. 7F of Jang illustrates a current i_{LS}

which is representative of the current through the inductor L_s on the alleged high voltage side. We submit that FIG. 7F is not indicative of illustrating correcting on-state lapses of time of various switching means so that their on-state resonant currents may be nearly equal to each other based on detected output of the alleged resonant current detecting means.

Additionally, in one embodiment and as a non-limiting example, FIG. 5 of the present application illustrates three scenarios wherein the driving means 4 alternately turns the pair of switching means 2-1 and 2-2 ON or OFF based on a result of comparison by the current value comparing unit 7. Depending on whether current value 1 is equal to/less than/greater than a current value 2, determines whether an on-state duty ratio is increased for a respective switching means. (See FIG. 5; page 11, paragraph [0027]). Accordingly, in at least one embodiment of the present application, it is possible to nearly equalize values of resonant currents that flow through a pair of switching elements, thereby preventing occurrence of a DC offset. (Specification; page 7, paragraph [0017]).

Accordingly, Applicant's submit that the cited art fails to describe either explicitly or inherently at least the recitation of claim 3 of "said driving means drives said low-voltage side pair of switching means or said high-voltage side pair of switching means by correcting their on-state lapses of time so that their on-state resonant currents may be nearly equal to each other based on the detected output of said resonant current detecting means."

In view of the foregoing, Applicant's respectfully submit that the rejection is overcome.

Claims 1-3 and 5 are rejected under 35 U.S.C. §102(e) as being anticipated by Eguchi (US 2007/0041222).

Applicant's submit that the cited art fails to teach or suggest at least the recitation of claim 1 of a resonant current detecting means. Similarly, regarding claim 3, Applicant's submit that the cited art fails to teach or suggest at least the recitation of a resonant current detecting means. Instead, the cited art describes a resonant frequency detecting means.

Claim Rejections - 35 U.S.C. §103

Claims 3 and 5 are rejected under 35 U.S.C. §103(a) as being unpatentable over Widener (US 5,057,698) in view of Zhang (US 6,262,905).

The Office Action asserts that Widener describes the recitation of claim 3 of "said driving means drives said low-voltage side pair of switching means or said high-voltage side pair of switching means by correcting their on-state lapses of time so that their on-state resonant currents may be nearly equal to each other based on the detected output of said resonant current detecting means." Applicant's disagree with the Office Action's assertion.

The Office Action correlates element 28 (resonant control and drivers) of Fig. 2 of Widener with that of the driving means of claim 3. Furthermore, the Office Action contends that the aforementioned recitation of claim 3 is described by Widener by asserting generally that "switching adjusts the sinusoidal current which is nearly equal." However, there is not teaching of correcting the alleged switching means of Widener so that their on-state resonant currents may be nearly equal to each other based on the detected output of the alleged resonant current detecting means of Widener.

Thus, upon review of Widener, Applicant's submit they are unable to find a description of the aforementioned recitation of claim 3. Further, Applicant's are unable to find a teaching within Zhang which cures the aforementioned deficiency of Widener. If the Examiner is to continue his rejection, we request that he more particularly point out where the aforementioned recitation of claim 3 is described in the cited art.

Double Patenting

Claims 1-3 and 5 are provisionally rejected on the group of non-statutory obviousness-type double patenting as being unpatentable over claims 1-3 and 5 of copending Application No. 10/579,468.

A terminal disclaimer is filed concurrently herewith. Accordingly, Applicant's respectfully submit that the rejection is overcome.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

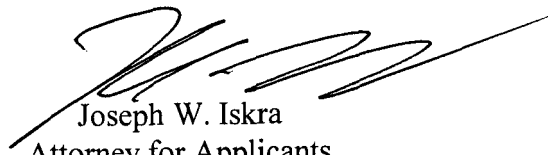
If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

Response After Final
Application No. 10/581,916
Attorney Docket No. 062520

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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